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FIJI TV HIGH POWER C-BAND SOLUTION TECHNICAL DETAILS

Presented by New Skies Satellites N.V.

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1 Executive Summary

New Skies Satellites is pleased to provide Fiji TV with the specific technical details of a C-Band solution suitable for the provision of satellite capacity for DTH services into Fiji and the surrounding region. New Skies is proposing to supply 2 x 36 MHz C-Band transponders on the Intelsat IS-701 satellite, stationed above Fiji at 180° East.

We believe that this solution provides substantially comparable, and in many respects superior, coverage to the NSS-5 Spot-2 beam for the Fiji TV project in Fiji and surrounding area:

- **IS-701 Offers Genuine DTH Performance –** The IS-701 satellite provides high C-Band downlink EIRP at compelling look angles into Fiji. This high level of performance will allow Fiji TV to offer DTH services to dishes as small as 120cm to 100% of the Fiji population with higher service availability than other Ku-Band solutions. This provides Fiji TV with the single most compelling reason to select C-Band as the solution for the roll out of DTH services in Fiji.

- **Outstanding Coverage of Fiji and the surrounding islands –** The IS-701 C-spot beam provides excellent coverage to the whole of Fiji and the surrounding region in a single beam. The extensive coverage allows Fiji TV to provide services not only to the entire Fijian archipelago but also throughout Samoa, Tonga, American Samoa, Tuvalu, and as far as Nauru, Cook Islands, Kiribati and Vanuatu, New Zealand. This high level of performance can be delivered into antennas of typically 120cm to 150cm as opposed to a Ku-Band solution that would provide either no coverage to the outlying islands or require antenna sizes of up to 3.7m.

- **C-Band DTH provides almost 100% availability** - With an EIRP of more than 38.5 dBW at beam peak and an average elevation angle of 68 degrees, IS-701 can provide service into dishes as small as 120cm throughout Fiji with a link availability of 99.98%. In equatorial and rain affected regions, DTH bouquets often operate in C-Band as it provides a robust service and offers a good compromise between economic service roll out, rapid business development and high service availability. A competing Ku-Band solution would typically provide a link availability of 99.5%, representing service outage for 44 hours per year.

- **Beam optimized to suit Fiji TV's market** - The IS-701 C-Spot beam is steerable. In consultation with Fiji TV, the position of the beam could be optimized across Fiji TV's major markets, allowing Fiji TV to maximize its potential customer base and minimize antenna sizes.

- **High Reliability –** The IS 7-series satellites have a reputation in the satellite industry for exceptional satellite reliability and availability.

The combination of performance and reliability make the C-Spot solution using the IS-701 platform the ideal solution for Fiji TV's requirements.

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2 Review of Fiji TV's Requirements

New Skies understands the principal requirements of Fiji TV to be:

- High satellite performance, reliability and service availability
- Provision of market leading DTH services to Fiji and the surrounding region
- Capacity for provision of 12 Video Channels
- Optimized customer antenna sizing for both Fiji and the surrounding region

New Skies is pleased to present its technical analysis, which shows that the C-Band solution substantively exceeds Fiji TV's requirements in a number of important areas.

In particular, the New Skies is prepared to provide:

- A C-Band solution providing link availability of almost 100% ensuring that the service is as robust as possible throughout this tropical region.
- Delivery of DTH programming not only to 100% of the Fijian population at antenna sizes of 120cm, but also to the surrounding islands of Samoa, Tonga, American Samoa, Tuvalu, and as far as Nauru, Cook Islands, Kiribati and Vanuatu.
- A solution for DTH service to consumer sized antennas
- Optimized transponder throughput supporting Fiji TV's broadcast requirements of 12 high quality video channels and a number of radio channels
- A solution that allows rapid deployment of cheap user antennas, substantially increasing Fiji TV's addressable market and driving future revenue growth

3 Technical Characteristics

3.1 EIRP and Receive Dish Size in Fiji

The IS-701 satellite offers high power coverage of Fiji and the surrounding region. As shown below, the IS-701 C-Spot beam provides coverage of Fiji with a peak beam power of more than 38 dBW. The majority of major cities in Fiji and Tonga are covered at EIRP's in excess of 37dBW, suitable for 120cm antennas.

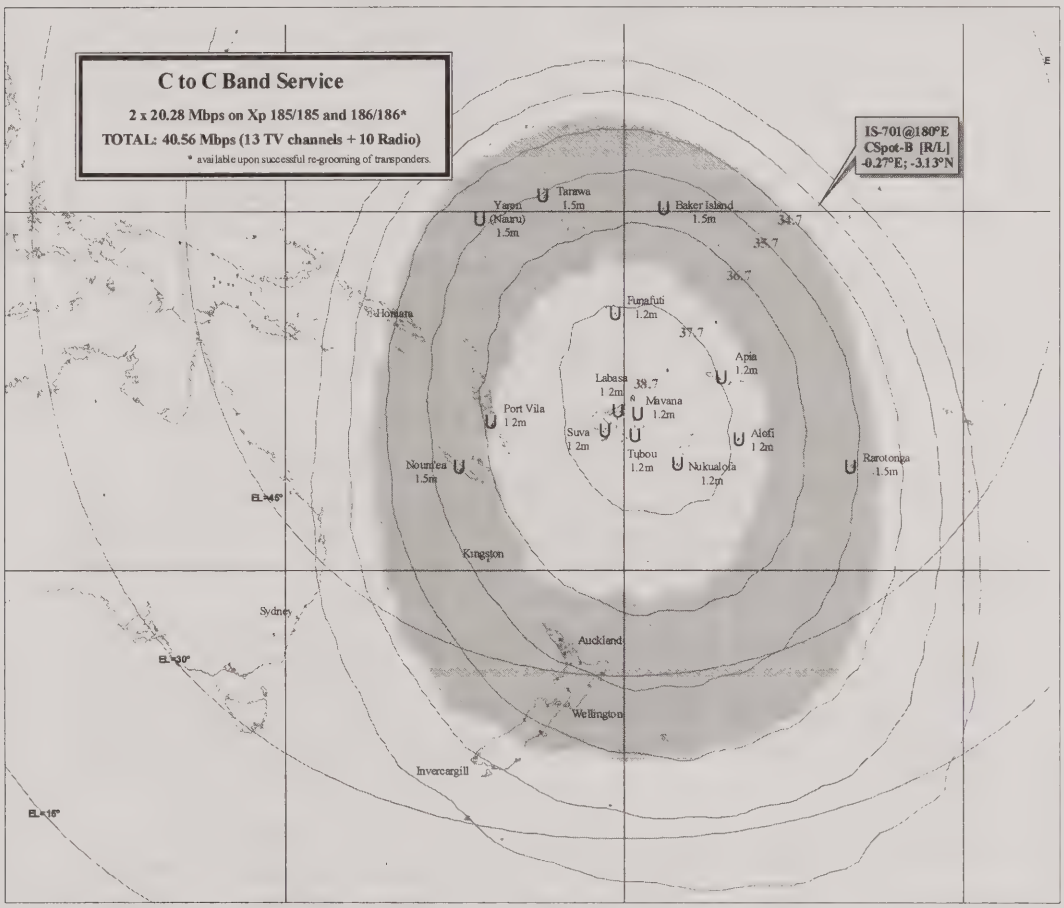

Figure 1 - Antenna Sizes on IS-701

The beam has been specifically located to mitigate the affects of rain fade on the downlink and to provide optimum performance in areas of high population density.

IS-701 is able to offer service to 100% of the Fijian population at antenna sizes of 120cm. This is a compelling technical advantage in favor of IS-701.

3.2 Link Budget Analysis

Rain causes depolarization and attenuation of RF signals from the satellite. The only way to overcome these atmospheric effects on the downlink path from satellite to user receiving dish is through the use of additional satellite beam power (EIRP). The C-Spot beam can be specifically located in order to match the pattern of heavy rainfall across Fiji and the surrounding region.

New Skies has prepared link analysis to determine the optimal dish size and availability that can offered across the IS-701 Fiji footprint.

Many variables contribute to the link analysis and they are all inter-related. Each has a very important impact on the results of the link analysis. These parameters include:

- ✓ Beam EIRP
- ✓ Elevation angle of receive dish to the satellite
- ✓ Transmit dish size (EIRP)
- ✓ Receive dish size
- ✓ Carrier size (Symbol rate)
- ✓ Modulation and Coding assumptions (Forward Error Correction)
- ✓ Assumed IRD performance (E_b/N_0)
- ✓ Target Service Availability
- ✓ Adjacent Satellite Interference
- ✓ Rain modeling and assumptions

New Skies has used conservative assumptions in performing the link analysis. These include the use of E_b/N_o performance as previously specified by AZCAR in connection with the NSS-5 Spot 2 capacity and realistic assumptions for the G/T of receiving antennas.

The link analysis derives the targeted EIRP per carrier required to close the link in clear sky conditions (0 dB rain margin). The analysis then compares this requirement with the total EIRP available per carrier and calculates the resulting rain margin present. Finally, using the ITU rain model, the link analysis calculates the availability of the service on an annual availability basis.

The following carrier parameters represent the best compromise between transponder throughput and service availability:

A 16.5 Msymbol, QPSK 2/3 FEC with RS resulting in a throughput of 20.28 Mbps. Total throughput in two transponders is equal to 40.56 Mbps.

Note that carrier throughput is simply a calculation based upon the modulation selected, the amount of forward error correction and whether outer (Reed Solomon) coding is applied. The calculation is as follows:

Baud Rate (Symbol Rate) x Modulation Multiple x FEC x RS = Information Rate

For the carrier selected for Fiji TV's service therefore:

16.5 Msymbol x 2 (QPSK) x 2/3 x 188/204 (RS) = 20.28 Mbps

A comparison of the link analyses for the C-Band and Ku-Band solutions is provided in the table below. The first two columns of results show the smallest size of antenna that can be used in each of the cities to generate an availability of at least 99.95%. As can be seen from the table, the C-Band solution can offer superior availability into 120cm dishes across the major population centers of Fiji and the surrounding region. Importantly, the availability in C-Band is significantly better throughout the beam than in Ku-Band.

This represents industry leading performance and is a result of a fully optimized beam, powerful EIRP, a high look angle to the satellite and high performance on board amplifiers. It provides Fiji TV with the means to rapidly build a community of DTH antennas in the Fijian region.

A detailed link budget is included in Appendix A.

Location	C-band			Ku-band	
	EIRP [dBW]	Antenna Size [cm]	Availability [%]	Antenna Size [cm]	Availability [%]
Suva	38	120	99.96	90	99.50
Nuku'alofa	38	120	99.96	90	99.70
Alofi	37.5	120	99.96	90	99.50
Funafuti	37.5	120	99.96	120	99.50
Apia	37.5	120	99.96	120	99.50
Port Vila	36.7	150	99.96	300	99.50
Rarotonga	35.0	180	99.96	300	99.50
Nauru	35.5	150	99.96	370	99.50
Tarawa	35.7	150	99.96	370	99.50
Wellington	35	180	99.96	Not served	Not served

Figure 2 - EIRP, Dish Size and Availability in Major Islands in Fijian region

3.3 Link Availability and Antenna Size

As can be seen from the above table, the C-Band solution provides service to equivalent or small antennas in all locations with the exception of Suva, Alofi and Nuku'alofa. In such locations as Port Vil and Nauru, the C-Band solution offers service into 1.5m antennas while the Ku-Band solution will require the users to purchase antennas in excess of 3.0m.

Furthermore, in the important Fijian islands, the C-Band solution offers link availability in excess of 99.96% as compared to 99.5% with a Ku-Band solution. This equates to an annual weather related average service interruption of less than 3 hours compared with more than 44 hours with the Ku-Band solution in Fiji.

3.4 Antenna Considerations

3.4.1 Antenna Installation

The relatively small difference between a 90cm Ku-Band antenna and a 120cm C-Band antenna ensures that installation methods will be similar regardless of the solution. In each case, installations can easily be accomplished by a single installer in a short time period. Indeed, in many cases, C-Band installations are likely to be accomplished in less time than Ku-Band installations because the C-Band antenna requires less pointing accuracy.

Moreover, the maximum antenna size for complete regional coverage at C-Band is in the range of 1.5m to 1.8m. In the case of the NSS-5 Ku-Band solution, regional coverage requires antenna sizes in Ku-Band of 3m in Port Vila and Rarotonga and 3.7m in Nauru and Tarawa. Installation of these large antennas is time consuming and costly in terms of transportation and installation. The C-Band solution provides a more uniform antenna size across the coverage region.

3.4.2 Antenna Polarization

The C-Band solution is circularly polarized while the Ku-Band solution is linearly polarized. Circular systems are easier to install and require no consideration of polarization alignment and optimization. This will potentially improve Fiji TVs service offering and the level of customer satisfaction.

3.4.3 Antenna Mounting and Pointing

120cm C-Band antennas may be pole mounted on a wall, roof or in a yard. Tri-pod mounting is also possible. In addition, the wider beam width and flatter gain profile of the C-Band antennas ensure that correct peaking of the antenna is more easily achieved without the need for specialist pointing equipment.

3.4.4 Antenna Comparisons

While Ku-Band antennas of 90 cm are widely available, Ku-Band systems of 120cm and above which would be required for regions outside Fiji are less common. Furthermore, C-Band antennas of 120cm are available and can be locally produced using standard wire mesh construction at competitive rates.

This wire mesh construction reduces the wind loading on the antenna and is hence suitable in a region susceptible to cyclones and severe weather conditions such as Fiji. In any event, 120cm antennas are easily detachable in heavy wind conditions, as a typical antenna will be attached via a simple u-bracket.

4. Conversion of Uplink Antenna

We understand that Fiji TV has installed a 6.3m Ku-Band transmit antenna in Suva. Our research indicates that this antenna could be retrofitted for C-Band operation at a cost of approximately US$280,000. This cost includes replacement of the feed horn and all RF equipment. A temporary antenna could be leased at a cost of approximately US$1,000 per day for operation at a manned site. In the event that Fiji TV already possesses a C-Band transmit antenna it is possible that we could design a work-around solution.

Appendix A – Link Budget

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Project: Fiji - DTH service

Link Analysis in CSB / CSB beam connectivity on 701 satellite at 180.00 ° East

A	**SATELLITE DATA**										
	Satellite	701									17-Sep-04
	Satellite orbital location	180									° E
	Beam (receive/ itransmit)	CSB	CSB								Calculate
	Transponder number (uplink/ downlink)	85	185								Eb/No
	Transponder frequency (uplink/ downlink)	6.28	4.055								GHz
B	**TRANSPONDER BC DATA**	@ BC									
	Transponder bandwidth & resource bandwidth	36									MHz
	Saturation e.i.r.p. at beam center	38.7									dBW
	Transponder Flux density at beam center	-93.0									dBW/m2
	Transponder G/T (receiving system senstivity)	-1.5									dB/K
	Operational mode	Single carrier									
	Transponder input back-off	-1.0									dB
	Transponder output back-off	0.0									dB
C	**EARTH STATION DATA**		L 1		L 2		L 3		L 4	L 5	L 6
	Transmit Earth Station		HUB		HUB		HUB		HUB	HUB	HUB
	Antenna diameter		6.3		6.3		6.3		6.3	6.3	6.3 m
	Latitude coordinates, North(+) South (-)		-18.10		-18.10		-18.10		-18.10	-18.1	-18.1 Degrees
	Longitude coordinates, East (+) West (-)		178.40		178.40		178.40		178.40	178.4	178.4 Degrees East
	S/C aspect correction at E/S		1		1		1		1	1	1 dB
	Antenna elevation angle		68.7		68.7		68.7		68.7	68.7	68.7 Degrees
	Antenna true azimuth		5.14		5.14		5.14		5.14	5.14	5.14 Degrees
	Voltage axial ratio		1.06		1.06		1.06		1.06	1.06	1.06
	Cross-pol isolation		30.7		30.7		30.7		30.7	30.7	30.7 dB
	Tracking capability		No		No		No		No	No	No
	Receive Earth Station		Suva		Funafuti		Port Vila		Rarotonga	Nauru	Tarawa
	Antenna diameter		1.2		1.2		1.5		1.8	1.5	1.5 m
	Latitude coordinates, North(+) South(-)		-18.1		-8.6		-18.3		-21.2	-0.5	2.0 Degrees
	Longitude coordinates, East (+) West (-)		178.4		179.2		168.6		200.1	167.0	174.0 Degrees East
	S/C aspect correction at E/S		0.7		1.2		2		3.7	3.2	3.2 dB
	Antenna elevation angle		68.7		79.8		64.9		56.3	74.7	82.6 Degrees
	Antenna true azimuth		5.14		5.33		32.71		314.66	87.84	108.37 Degrees
	Voltage axial ratio		1.3		1.3		1.3		1.3	1.3	1.3
	Cross-pol isolation		17.7		17.7		17.7		17.7	17.7	17.7 dB
	Figure of merit, G/T at 4.0 GHz		12.0		12.0		14.0		15.6	14.0	14.0 dB/K
	Computed receive station G/T		12.0		12.0		14.0		15.6	14.0	14.0 dB/K
	Computed receive gain G at 4.0 GHz		32.0		32.0		34.0		35.6	34.0	34.0 dBi
	Tracking capability		No		No		No		No	No	No
D	**CARRIER DATA**		L 1		L 2		L 3		L 4	L 5	L 6
	Carrier description code		DVB-2		DVB-2		DVB-2		DVB-2	DVB-2	DVB-2
	Modulation scheme		QPSK		QPSK		QPSK		QPSK	QPSK	QPSK
	Information rate		20280		20280		20280		20280	20280	20280 kbps
	Overhead		0.0		0.0		0.0		0.0	0.0	0.0 kbps
	FEC coding		0.667		0.667		0.667		0.667	0.667	0.667
	RS outer coding		204/188		204/188		204/188		204/188	204/188	204/188
	Transmission rate		33008.2		33008.2		33008.2		33008.2	33008.2	33008.2 kbps
	Carrier's allocated bandwidth		22.2810		22.2810		22.2810		22.2810	22.2810	22.2810 MHz
	Carrier's IF noise bandwidth		16.5041		16.5041		16.5041		16.5041	16.5041	16.5041 MHz
	Number of assigned carriers	1	1		0		0		0	0	0 #
	Required Carrier Performance										
	C/N threshold		6.1		6.1		6.1		6.1	6.1	6.1 dB
	Eb/No threshold (Info+OH), Analog S/N		5.2		5.2		5.2		5.2	5.2	5.2 dB
	U/L rain margin		1.4		1.4		1.4		1.4	1.4	1.4 dB
	D/L rain margin		1.50		1.50		1.50		1.50	1.50	1.50 dB
	Annual availability		99.964		99.964		99.964		99.964	99.964	99.964 %

E	CARRIER's D/L EIRP AND INPUT/OUTPUT BACKOFI		1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	
	Earth station transmit e.i.r.p.		69.0	69.4	68.4	68.6	69.5	69.4	dBW
	Uplink path loss		199.6	199.6	199.6	199.6	199.6	199.6	dB
	Gain of 1m^2 antenna		37.4	37.4	37.4	37.4	37.4	37.4	dBi/m^2
	Uplink margin for rain, etc.		0.0	0.0	0.0	0.0	0.0	0.0	dB
	Per carrier flux density at s/c		-94.2	-93.8	-94.8	-94.6	-93.7	-93.8	dBW/m^2
	Transponder saturation flux density		-93.0	-93.0	-93.0	-93.0	-93.0	-93.0	dBW/m^2
	Carrier input backoff [xpdr = -0.79 dB]		-1.2	-0.8	-1.8	-1.6	-0.7	-0.8	dB
	Transponder IBO/OBO ratio	-0.8	1.0	1.0	1.0	1.0	1.0	1.0	dB
	Carrier output backoff [xpdr OBO = 0.21 dB]		-0.2	0.2	-0.8	-0.6	0.3	0.2	dB
	XPR saturation e.i.r.p. at beam center		38.7	38.7	38.7	38.7	38.7	38.7	dBW
	Per carrier down-link e.i.r.p. @ beam center		38.5	38.9	37.9	38.1	39.0	38.9	dBW
	Power equivalent bandwidth per carrier		34.23	37.65	29.84	31.18	38.21	37.91	MHz
F	LINK BUDGET		L1	L2	L3	L4	L5	L6	
	Transmit antenna e.i.r.p. per carrier		69.0	69.4	68.4	68.6	69.5	69.4	dBW
	Uplink path loss		199.6	199.6	199.6	199.6	199.6	199.6	dB
	Satellite G/T at beam center		-1.5	-1.5	-1.5	-1.5	-1.5	-1.5	dB/K
	Uplink aspect correction		1.0	1.0	1.0	1.0	1.0	1.0	dB
	Uplink rain margin.		0.0	0.0	0.0	0.0	0.0	0.0	dB
	C/T uplink (thermal)		-133.1	-132.7	-133.7	-133.5	-132.6	-132.7	dBW/K
	C/N uplink		23.3	23.7	22.7	22.9	23.8	23.8	dB
	C/T E/S HPA intermodulation	7	-121.9	-121.5	-123.0	-123.6	-122.3	-122.3	dBW/K
	C/I E/S HPA intermodulation		34.6	34.9	33.4	32.9	34.1	34.1	dB
	Transponder IM density limit or C/IM	-31.7	-31.7	-31.7	-31.7	-31.7	-31.7	-31.7	dB/4kHz or dB
	Xpdr intermodulation C/T		-122.4	-122.0	-123.0	-122.8	-121.9	-122.0	dBW/K
	C/I Transponder intermodulation		34.0	34.4	33.4	33.6	34.5	34.5	dB
	D/L aspect correction towards RX E/S		0.7	1.2	2.0	3.7	3.2	3.2	dB
	Downlink e.i.r.p. towards Rx E/S		37.8	37.7	35.9	34.4	35.8	35.7	dBW
	Downlink path loss		195.8	195.7	195.8	195.9	195.8	195.7	dB
	E/S G/T at operating frequency		12.2	12.2	14.1	15.7	14.1	14.1	dB/K
	D/L rain margin		0.0	0.0	0.0	0.0	0.0	0.0	dB
	C/T downlink (thermal)		-145.8	-145.9	-145.8	-145.8	-145.9	-145.8	dBW/K
	C/N downlink		10.6	10.6	10.6	10.6	10.6	10.6	dB
	Co-channel interference (value of "X")	20	20	20	20	20	20	20	dB
	C/T Co-channel Interference		-140.7	-140.7	-140.4	-140.4	-140.4	-140.4	dBW/K
	C/T total per carrier		-147.2	-147.2	-147.1	-147.1	-147.1	-147.1	dBW/K
	C/N total per carrier		9.2	9.2	9.2	9.2	9.2	9.2	dB
	Margin for ASI & other losses	2	2.0	2.0	2.0	2.0	2.0	2.0	dB
	C/T available per carrier		-149.2	-149.2	-149.1	-149.1	-149.1	-149.1	dBW/K
	Boltzmann's constant		-228.6	-228.6	-228.6	-228.6	-228.6	-228.6	dBW/K-Hz
	C/No=C/T-10*Log(1.38*10^(-23)		79.4	79.4	79.5	79.5	79.5	79.5	dB
	(Co+No)/No (relative to transmission rate)		8.0	8.0	8.0	8.0	8.0	8.0	dB
	Receiver noise bandwidth		72.2	72.2	72.2	72.2	72.2	72.2	dB-Hz
	Desired Eb/No		5.2	5.2	5.2	5.2	5.2	5.2	dB
	C/N total, clear sky		7.2	7.2	7.3	7.3	7.3	7.3	dB
	Eb/No total, clear sky		6.3	6.3	6.4	6.4	6.4	6.4	dB
	Annual availability		99.964	99.964	99.964	99.964	99.964	99.964	%

G	UPLINK AND OFF-AXIS EMISSION e.i.r.p. DENSITY	L1	L2	L3	L4	L5	L6	
	Transmit antena diameter	6.3 m	6.3 m	6.3 m	6.3 m	6.3 m	6.3 m	m
	Antenna up-link e.i.r.p. per carrier	69.0	69.4	68.4	68.6	69.5	69.4	dBW
	Computed transmit antenna gain at 6 GHz	50.4	50.4	50.4	50.4	50.4	50.4	dBi
	Unmodulated CXR energy dispersal	16.504	16.504	16.504	16.504	16.504	16.504	MHz
	Conversion of bandwidth to 4 or 40 KHz	36.2	36.2	36.2	36.2	36.2	36.2	dB
	Power at antenna feed	-17.6	-17.2	-18.2	-18.0	-17.1	-17.2	dBW/4kHz
	Off-axis antenna gain at 3 Degrees	17.1	17.1	17.1	17.1	17.1	17.1	dBi
	Off-axis eirp density at 3 Degrees	-0.5	-0.1	-1.1	-0.9	-0.1	-0.1	dBW/4kHz
	Off-axis e.i.r.p. constraint	20.1	20.1	20.1	20.1	20.1	20.1	dBW/4kHz
	Margin	20.6	20.2	21.2	21.0	20.1	20.2	dB
	On axis power density	-53.6	-53.2	-54.2	-54.0	-53.1	-53.2	dBW/Hz
H	DOWNLINK POWER FLUX DENSITY							
	Aspect correction at 5 Deg. elevation angle	0	0	0	0	0	0	dB
	Downlink e.i.r.p. per carrier (beam centre)	38.5	38.9	37.9	38.1	39.0	38.9	dBW
	Downlink e.i.r.p. density per 4 kHz	2.3	2.8	1.7	1.9	2.8	2.8	dBW/4kHz
	Gain of 1m^2 antenna at 4 GHz	33.5	33.5	33.5	33.5	33.5	33.5	dBi/m^2
	Power flux density at Earth's surface	-160.0	-159.5	-160.6	-160.5	-159.4	-159.4	dBW/m^2/4kHz
	Worst case elevation angle	5	5	5	5	5	5	Degrees
	ITU Radio Regulation limit	-152.0	-152.0	-152.0	-152.0	-152.0	-152.0	dBW/m^2/4kHz
	Margin	8.0	7.5	8.6	8.5	7.4	7.4	dB
	Downlink power density	-33.7	-33.2	-34.3	-34.1	-33.2	-33.2	dBW/Hz
I	DOWNLINK POWER SUMMARY	L1	L2	L3	L4	L5	L6	
	Downlink e.i.r.p. per carrier	38.5	38.9	37.9	38.1	39.0	38.9	dBW
	Quantity of active carriers	0.0	-100.0	-100.0	-100.0	-100.0	-100.0	dB
	Downlink e.i.r.p. per link	38.5	-100.0	-100.0	-100.0	-100.0	-100.0	dBW
	Total EIRP Used : 34.3 dBW (BC)	35.8	0	0	0	0	0	
	Desired per carrier E/S uplink e.i.r.p.	n/a	n/a	n/a	n/a	n/a	n/a	
	Desired per carrier e.i.r.p. @ beam center	n/a	n/a	n/a	n/a	n/a	n/a	
	BANDWIDTH SUMMARY							
	Allocated bandwidth per carrier	22.2810	22.2810	22.2810	22.2810	22.2810	22.2810	MHz
	Quantity of assigned carriers	1	0	0	0	0	0	#
	Total bandwidth used per link	22.2810	0.0000	0.0000	0.0000	0.0000	0.0000	MHz

Total Bandwidth: 22.28 MHz of 36 MHz transponder bandwidth

GRAND TOTAL	Bandwidth MHz	Power dBW
Total Transponder Resource	36	38.7
Total Utilization	22.28	38.50
Power Equivalent Bandwidth	34.30	
Required Resource	36	38.7
Margin	13.70	0.0

Fade analysis: Worse of uplink or downlink

J	UPLINK EARTH STATION HPA SIZE	6.3	6.3	6.3	6.3	6.3	6.3	Ant. diameter [m]
	Radiated uplink e.i.r.p. per carrier	69.0	69.4	68.4	68.6	69.5	69.4	dBW
	Computed peak antenna gain	50.4	50.4	50.4	50.4	50.4	50.4	dBi
	Quantity of carriers per HPA	2	1	1	1	1	1	#
	Total antenna flanche e.i.r.p.	21.6	19.0	18.0	18.1	19.0	19.0	dBW
	Transmission loses [in dB]	2	2	2	2	2	2	dB
	HPA output back-off [in dB]	4	4	4	4	4	4	dB
	HPA requirements [Watts]	570.59	314.55	249.29	260.51	319.27	316.76	Watts